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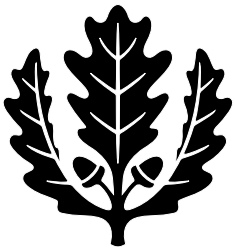

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Abstract

We develop a two-sector economy where each sector is classified as classical/Keynesian (contract/noncontract) in the labor market and traded/nontraded in the product market. We consider the effects of changes in monetary and exchange rate policy on sectoral and aggregate prices and outputs for different sectoral characterizations. Duca (1987) shows that nominal wage rigidity facilitates the effectiveness of monetary policy even in the classical sector. We demonstrate that trade price rigidity provides a similar path for the effectiveness of monetary policy, in this case, even when both sectors are classical.

Keywords: multisectoral economies, monetary policy, exchange rate policy

I. Introduction

Cross-country and cross-temporal studies show that aggregate demand shocks and currency devaluation have varying effects on different variables.[i] Most theoretical models, especially those that consider the aggregate economy, have difficulty explaining these differences in the effects of monetary and exchange rate shocks on different economic variables. Lilien (1982) asserts that since aggregate models overlook the composition of, and changes in, the different sectors, they cannot capture important aspects of the economy. To wit, he maintains that sectoral shifts in employment shares from durable manufacturing into service-related industries induce general downturns in the economy. Models that consider sectoral differences and international factors better position themselves to explain the different effects of monetary and exchange rate policies on different economic variables, both at the sectoral and aggregate levels.

Duca (1987), building on the work of Blinder and Mankiw (1984), develops a closed-economy two-sector model. He determines that wage stickiness in one sector allows monetary policy to have real effects in the other sector, even if it has perfectly flexible wages and prices. Our open economy model takes this observation one step further -- traded-good price stickiness allows monetary policy to have real effects even if both sectors have perfectly flexible wages and prices. Moreover, monetary policy has no real effect only if the traded-good sector is Keynesian. This latter result emerges because with traded-good and wage stickiness, the real wage is fixed and monetary policy has no effect on production.

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[i] Schultze (1984) demonstrates, for example, that demand shocks affect variables in different countries, and even the same country, during different time periods differently. Similarly, Ball, Mankiw, and Romer (1988) find that shocks in nominal GNP affect real output and the price level differently in various countries. Craig (1981) shows that the real money supply affects the real trade balance of different countries with different intensities. Similarly, Edwards (1989) documents that devaluation has different effects on the current accounts of different economies, finding that while in most countries a devaluation improves the current account after a year (though to different degrees), in some countries the current account worsens.

Recapping, we model the economy at the disaggregated level where each sector is characterized as either classical or Keynesian in the labor market and either traded or nontraded in the product market. The development of two-sector closed-economy model that distinguishes between classical and Keynesian labor markets was pioneered by Blinder and Mankiw (1984). Others that have extended the discussion include Duca (1987), Duca and Vanhoose (1990), and Waller (1992). These models focus on distinctions between the supply sides of the respective sectors.[ii] The distinction between traded and nontraded sectors in the product market has a long and distinguished tradition in international trade theory. The literature includes Salter (1959), Swan (1960), Edgren et al. (1969), Aukrust (1970), Bruno (1976), and Rodseth (1979). This traded and nontraded distinction has important implications for the adjustment of prices in the two sectors.

No attempt exists, to our knowledge, to examine an economy that combines the characteristics of these two sectoral divisions simultaneously. We fill this void and consider how wage contracts and world-determined prices can alter the effectiveness of monetary and exchange rate policies on sectoral and aggregate prices and outputs. To accomplish this task, we combine elements of those multisectoral models noted above -- Blinder and Mankiw (1984), Duca (1987), Duca and Vanhoose (1990), and Waller (1992) -- as well as the monetary model of the balance of payments.[iii] As in some monetary models (e.g., Polak 1957-58), domestic credit expansion affects the demand for goods and, as such, the trade balance. In our model, additional supply-side effects emerge, given the different sectoral characteristics.

[ii] A literature on labor market segmentation exists that distinguishes between primary and secondary sectors, based on labor market characteristics. The real wage is fixed above the equilibrium level in the primary labor market, but clears the secondary labor market. This literature includes Blomqvist (1978), Calvo (1978), Demekas (1990), Harris and Todaro (1969), and Todaro (1969).

[iii] A monetary model of the balance of payments consists of money market equilibrium, where the money supply is a function of domestic and international assets of the central bank. The balance of payments is the change in excess reserves. For an outline of the monetary model of the balance of payments, see Swoboda (1976).

Our analysis not only helps to understand the differing cross-country and cross-temporal responses to aggregate demand shocks, but also has important implications concerning monetary and exchange rate policies. When implementing policies, the authorities should consider the underlying characteristics of the different sectors. Such consideration becomes particularly important for "conditionality," the stabilization policies of the International Monetary Fund (IMF).[iv] Our consideration of stabilization policies uses a modified version of Polak's (1957-58) monetary model of the balance of payments (e.g., see Hallwood and MacDonald 1994). Monetary restraint and currency devaluation improve the current account in Polak's model. Our analysis shows that the effects of monetary and exchange rate policies may differ between economies that have differing sectoral characteristics.[v]

Our model also indicates that monetary and exchange rate policies may, in some instances, lead to sectoral conflicts. Under certain sectoral characterizations, expansionary monetary or exchange rate policy may lead to the contraction of output in one sector and the expansion of output in the other, unlike the findings of Duca (1987), Duca and Vanhoose (1990), and Waller (1992). The authorities, in these cases, could use policy to favor one sector over the other.

While eight different combinations of sectoral characteristics are feasible, some cases are more interesting than others. We only consider cases that include both traded- and nontraded-good sectors. For example, in developed countries, the case where nontraded goods (e.g., services) are produced in a classical (nonunionized) sector and traded goods

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[iv] Rodrik (1990) distinguishes between *stabilization* and *structural-adjustment* policies prescribed by the IMF. Stabilization policies mainly involve fiscal and monetary restraint and currency devaluation, while structural adjustment encompasses different microeconomic and institutional reforms to remove inefficiencies that inhibit growth.

[v] The structuralists criticize the use of IMF stabilization policies on different grounds. For example, Taylor (1983) argues that the economies of developing countries are diverse, with economy-specific structural rigidities and, as such, the use of a single set of policies can lead to differing results.

(e.g., manufactured goods) in the Keynesian (unionized) sector may be important in countries with relatively low unionization rates (e.g., the U. S.). For developed countries with high unionization rates (e.g., Sweden, Denmark, and Finland), the case where both the traded and nontraded sectors are Keynesian may be relevant. Similarly, for developing countries with large numbers of enterprises owned by the state (e.g., utilities, transportation, and communication sectors) that can be classified as Keynesian nontraded, monetary and exchange rate policies in countries that export primary goods produced in the traditionally nonunionized sector (e.g., Bangladesh, Senegal, and Tanzania) may have different effects than in countries that export manufactured goods produces in the traditionally unionized sectors (e.g., Mexico and India).

II. The Basic Model

Consider a small open economy in the short run. Assume that the capital stock is fixed and that firms hire/fire labor, the variable factor, to alter output. This assumption is commonly used in short-run models because of the long gestation period of investment relative to the time horizon for stabilization policies.

The economy divides into classical and Keynesian sectors based on the flexibility of nominal wages in the labor markets. Following, Duca (1987), Duca and Vanhoose (1990), and Waller (1992), we assume that the number of workers in each sector is fixed and immobile, since different sectors require different talents and skills and since these talents and skills are difficult to acquire in the short run. The classical labor market experiences Walrasian market clearing, while nominal wages in the Keynesian labor market are negotiated and determined one period in advance. Each sector produces either traded or

nontraded goods. The price of the nontraded good clears the market, but the world market determines the traded-good price, which is exogenously given for a small open economy.[vi]

The Labor Market:

The production function in each sector i (i = C, K, representing the classical and Keynesian sectors, respectively) is given as follows:

$$Y_i = Y_i(L_i); \qquad Y_{iL} = (\partial Y_i/\partial L_i) > 0,\ Y_{iLL} = (\partial^2 Y_i/\partial L_i^2) < 0, \tag{1}$$

where Y_i is real output and L_i is the labor employed in the i-th sector. The demand for labor in sector i (L_i^d) is determined by the following profit maximizing condition:

$$Y_{iL} = (W_i/P_i), \tag{2}$$

where W_i is the nominal wage and P_i is the price in the i-th sector. The demand for labor is a positive function of the real production wage (W_i/P_i).

The labor supply in each sector depends positively on the real consumption wage, which is the nominal wage in each sector divided by the aggregate price level (W_i/P). The aggregate price level (P) is defined as follows:

$$P = P_{iT}^{\alpha}\, P_{jNT}^{\beta};\ i = C,\ K,\ j = C,\ K, \tag{3}$$

where $\alpha + \beta = 1$ and α and β are the weights of good i and j in consumption and T and NT stand for traded- and nontraded-good sectors. We shall only consider sectoral combinations that involve traded and nontraded sectors.

This distinction between the demand for labor depending on the real production wage and the supply of labor depending on the real consumption wage proves fundamental to the results of our model, as it also does for Duca (1987), Duca and Vanhoose (1990), and Waller (1992). We need to determine equilibrium in the classical and Keynesian labor markets.

[vi] The prices of traded goods are fixed (sticky) for a small open economy with fixed exchange rates. With flexible exchange rates, prices move with the exchange rate. The exchange rate clears the foreign exchange market.

Given technology, market clearing determines the nominal wage in the classical labor market (W_C). Labor market equilibrium gives the nominal wage rate as follows:

$$W_C = W_C(P_C, P). \tag{4}$$

The wage rate in the classical sector is homogeneous of degree one in the price in the classical sector and the aggregate price level. Substituting the market-clearing nominal wage into the labor demand and then substituting the resulting labor demand into the production function produces the supply function in the classical sector as follows:

$$Y^s_C = Y^s(P_C, W_C) = Y^s(P_C, W_C(P_C, P)). \tag{5}$$

Output supplied in the classical sector is homogeneous of degree zero in P_C and W_C or, equivalently, in P_C and P. Thus, the following conditions hold:

$$\begin{aligned} p = p_C \ \text{Þ}\ p = w_C = p_C \ \text{Þ}\ dY^s_C = 0; \\ p < p_C \ \text{Þ}\ p < w_C < p_C \ \text{Þ}\ dY^s_C > 0; \text{ or} \\ p > p_C \ \text{Þ}\ p > w_C > p_C \ \text{Þ}\ dY^s_C < 0, \end{aligned} \tag{6}$$

where π, π_C, and ω_C are the percentage changes in the aggregate price level, the classical sector's price, and the classical sector's nominal wage, respectively.

These key results fundamentally lead to many of the conclusions of the model. In words, a sector's output changes when that sector's price grows at a rate different from that of the aggregate price level. For example, assume that the classical sector's price grows more rapidly than the aggregate price level. The supply of labor depends on the real consumption wage. Thus, to keep the same level of labor supply, the nominal wage must rise at the same rate as the aggregate price level. If true, then the real product wage must fall, since the classical sector's price rises more rapidly than the aggregate price level. A lower real product wage increases the demand for labor, leading to higher output and a higher real consumption wage. That is, when the classical sector's price rises more rapidly than the aggregate price level, then the nominal wage rises at some rate in between. As a consequence, output increases in the classical sector. The opposite logic holds when the aggregate price level rises more rapidly than the classical sector's price.

In the Keynesian labor market, the wage is negotiated one period in advance. Thus,

$$W^e_K = E_{t-1}\, W_{Kt}, \qquad (7)$$

where $E_{t-1}\, W_{kt}$, is the expected value of W for period t based on information available at time t-1. Given this negotiated nominal wage, employment emerges from the firms' labor demand function and the supply of output in the Keynesian sector becomes a positive function of its price. That is,

$$Y^s_K = Y^s_K(P_K, W^e_K), \quad (\partial Y^s_K/\partial P_K) > 0. \qquad (8)$$

The Goods Market:

The supply of goods produced in the classical and Keynesian sectors is given by equations (5) and (8), respectively. The demand for goods in sector i (i = C, K) is given by the following:

$$Y^d_i = Y^d_i(M, P_i, P_j), \quad (\partial Y^d_i/\partial M) > 0, (\partial Y^d_i/\partial P_i) < 0, (\partial Y^d_i/\partial P_j) > 0, \qquad (9)$$

where M is the stock of nominal money balances. The demand for goods relates positively to money balances, negatively to the price of the good, and positively to the price of the good in the other sector, assuming gross substitutability between the two goods. Note that the demand for goods is homogeneous of degree zero in money balances and prices.

Prices are determined with the following principles:

1. Price clears the market for ***nontraded*** goods. That is, equations (5) or (8) and (9) determine the equilibrium price and quantity produced.
2. For ***traded*** goods under fixed exchange rates, price is determined through the following equation:

$$P_{iT} = E^* P^F_{iT}, \quad i = C, K, \qquad (10)$$

where E^* is the fixed exchange rate (defined as the domestic currency price of a unit of foreign exchange) and P^F_{iT} is the international price of the traded good.

The resulting current account for sector i (Ca_i) is defined as follows:[vii]

$$CA_i = P_{iT}(Y^s_i - Y^d_i), \quad i = C, K. \tag{11}$$

The Money Market:

Money market equilibrium occurs when

$$MV = PY^d, \tag{12}$$

where

$$Y^d = (Y^d_{iT})^a (Y^d_{jNT})^b, i, j = C, K, \text{ and} \tag{13}$$

$$M = F + D, \tag{14}$$

where V is the velocity of circulation (given exogenously), Y^d is the index of aggregate output demanded, F is the net foreign assets (reserves) held with the central bank, and D is the exogenously determined domestic credit expansion. The money multiplier equals one. Also, note that

$$DF = F_t - F_{t-1} = CA. \tag{15}$$

III. Model Solution and Comparative Statics

Though we assume that one sector is traded and the other nontraded, the sectors can either be both classical, both Keynesian, or one classical and the other Keynesian.[viii] The model possesses 12 independent equations determining the following 12 variables: Y^s_T, Y^d_T, Y_{NT}, Y^d, W_C, W_K, P_C, P_K, P, C_i, M, and F (Y_{NT} is the equilibrium output level in the nontraded-good sector). Wages and prices in the two sectors, however, determine all other variables such as output supplied and demanded and the corresponding trade balance in

[vii] With no income earned from assets, the trade balance and the current account are identical. We also assume that the Marshall-Lerner condition holds.

[viii] When both sectors produce traded goods, the economy does not have a nontraded-good sector. When both sectors produce nontraded goods, the economy is closed to trade. Thus, we consider only economies with traded- and nontraded-good sectors.

both sectors. Thus, once we determine how the money supply and the exchange rate affect wages and prices, then the comparative static results for the remaining variables are easily determined.

We now derive the comparative static results for an increase in the money supply and a devaluation of domestic currency on the prices in both sectors and the nominal wage rate in the classical sectors for four cases -- classical traded and nontraded sectors, Keynesian traded and nontraded sectors, Keynesian traded and classical nontraded sectors, and classical traded and Keynesian nontraded sectors. We assume that direct effects exceed indirect effects (e.g., the increase in demand due to an increase in the money supply is greater than the resulting increase in demand from the cross-price effect). In our fixed exchange rate world, the central bank changes reserves (F) to keep the exchange rate at the desired level. To control the money supply, the central bank uses domestic credit expansion.[ix] As such, monetary policy converts domestic credit into an endogenous variable to make the money stock exogenous.

CASE 1: Classical Traded (CT) and Classical Nontraded (CNT) Sectors:

Here, markets determine the nominal wages in the two sector's classical labor markets and the price of the nontraded good. Market clearing implies that

$$W_{CT} - W_{CT}(P_{CT}, P) = 0; \qquad (16)$$

$$W_{CNT} - W_{CNT}(P_{CNT}, P) = 0; \text{ and} \qquad (17)$$

$$Y^{s}_{CNT}(P_{CNT}, W_{CNT}(P_{CNT}, P)) - Y^{d}_{CNT}(M, P_{CT}, P_{CNT}) = 0. \qquad (18)$$

These implicit functions lead to the following comparative static results for a change in the money supply:[x]

$$(\partial W_{CT}/\partial M) > 0; (\partial W_{CNT}/\partial M) > 0; \text{ and } (\partial P_{CNT}/\partial M) > 0. \qquad (19)$$

[ix] To keep the analysis relatively simple, we do not discuss long-run dynamics, such as devaluations undertaken where a country runs down reserves from an ongoing balance of payments deficit.

[x] A complete specification of the comparative static results is available from the authors.

An increase in the money supply raises the demand for goods in both sectors. This causes the price of the nontraded good to increase (condition 3 in 19). With the price of the traded good fixed at the world level, the aggregate price level increases by less than the nontraded-good price. As a result, $\pi_{NT} > \pi > \pi_T = 0$. Wages in both sectors increase (conditions 1 and 2 in 19). Moreover, the conditions in (6) ensure that the rise in wages in each sector lies between the rise in that sector's price and the aggregate price level.

The effect of a higher money supply on output demanded and supplied is determined by substituting the effects of the money supply on the wages and prices into the equations for determining the output demands and supplies. These effects are given as follows:

$$(\partial Y^d_{CT}/\partial M) > 0; (\partial Y^d_{CNT}/\partial M) > 0; (\partial Y^s_{CT}/\partial M) < 0; \text{ and } (\partial Y^s_{CNT}/\partial M) > 0. \quad (20)$$

Conditions 1 and 2 in (20) indicate the effect of money supply changes on demand in the traded- and nontraded-good sectors. Two effects exist -- direct income (money supply) and indirect price effects. The indirect effect in the traded-good sector emerges from the price of the nontraded good affecting demand positively, assuming gross substitutability. Since the proportional increase in the nominal wage in each sector lies between the proportional increases in the sector's price and the aggregate price level (i.e., $\pi_{NT} > \omega_{NT} > \pi > \omega_T > \pi_T = 0$), the real consumption wage falls and the real production wage rises in the traded-good sector while the real consumption wage rises and the real production wage falls in the nontraded-good sector. As a consequence, output supplied in the nontraded-good sector increases while that in the traded-good sector decreases (conditions 3 and 4 in 20).

In sum, we do not know the effect of monetary policy on aggregate output, it could be higher or lower. This result counters the findings of Duca (1987) and others, who find that an increase in monetary policy increases output in both sectors. Our result hinges critically on the opposite movements in the real consumption and real production wages in the two sectors. We return to this issue when we summarize our findings in the conclusion.

Finally, the demand for and supply of the nontraded good increase, but the demand shift exceeds the supply shift, since the price of the nontraded good also increases. Also the supply of the traded good falls and its demand rises. Consequently, the trade balance (current account) worsens, remembering that the price of the traded good does not change.

The implicit functions (i.e., equations 16 to 18) generate the following comparative static results for a change in the exchange rate:

$$(\P W_{CT}/\P E) > 0; (\P W_{CNT}/\P E) > 0; \text{ and } (\P P_{CNT}/\P E) > 0. \qquad (21)$$

Devaluation increases the price of the traded good and this, through the cross-price effect, increases the demand for the nontraded good, pushing up the price in this sector (condition 3 in 21). Assuming, once again, that direct price effects exceed indirect price effects, our results indicate that $\pi_T > \omega_T > \pi > \omega_{NT} > \pi_{NT}$. Note that the traded-good price is fixed in foreign currency on the world market. The increase in the domestic-currency traded-good price reflects entirely the devaluation.

Devaluation causes the price of the traded good to increase more than the aggregate price level. The labor market clears with a nominal wage rising such that the real consumption wage rises, but the real production wage falls. As such, more labor is employed and output rises in this sector. The nontraded-good price rises by less than the increase in the aggregate price level. Now, roles are reversed with a lower real consumption wage and a higher real production wage, leading to reduced employment and output. So a devaluation has an ambiguous effect on aggregate output because the classical nontraded-good sector experiences a decline in output, which may exceed or fall short of the positive response in output in the classical traded-good sector.

CASE 2: Keynesian Traded (KT) and Keynesian Nontraded (KNT) Sectors:

Now with both sectors Keynesian, contracts determine both wages. Thus, only the nontraded-good price is market determined through the following equilibrium condition:

$$Y^s_{KNT}(P_{KNT}, W^e_{KNT}) - Y^d_{KNT}(M, P_{KT}, P_{KNT}) = 0. \qquad (22)$$

This equilibrium condition generates the following comparative static result:

$$(\P P_{KNT}/\P M) > 0. \quad (23)$$

A larger money supply leads to increased demand in both sectors, causing the price to rise in the nontraded-good sector.

The effect on the supply of goods in the two sectors is a bit different than in Case 1. That is, we have as follows:

$$(\P Y^s_{KNT}/\P M) > 0; \text{ and } (\P Y^s_{KT}/\P M) = 0. \quad (24)$$

Output supplied in the Keynesian nontraded-good sector responds positively to an increase in the money supply (condition 1 in 24). In this sector with fixed wages, an increase in the money supply increases the demand for, and the price of, the nontraded good, and this increases output produced. Output supplied in the Keynesian traded-good sector, however, is unaffected by changes in the money supply (condition 2 in 24). Here both the wage and the world-determined price are fixed. Thus, the real production wage and labor demand do not change, and labor demand determines output in Keynesian sectors. The increase in the price of the nontraded good further increases the demand for the traded good through the cross-price effect, worsening the trade balance.

A devaluation increases the price of the traded good to domestic residents and this, through the cross-price effect, increases the demand for and the price of the nontraded good. Since both sectors are Keynesian, price increases reduce the real production wage, leading to higher employment and output in both sectors.

CASE 3: Keynesian Traded (KT) and Classical Nontraded (CNT) Sectors:

The Keynesian traded sector possesses both a fixed nominal wage and a fixed (world-determined) price. Market clearing only occurs in the classical sector's good and labor markets, given by the following equilibrium conditions:

$$W_{CNT} - W_{CNT}(P_{CNT}, P) = 0; \text{ and} \quad (25)$$

$$Y^s_{CNT}(P_{CNT}, W_{CNT}(P_{CNT}, P)) - Y^d_{CNT}(M, P_{CT}, P_{CNT}) = 0. \quad (26)$$

These implicit functions generate the following comparative static results:

$$(\P W_{CNT}/\P M) > 0; \text{ and } (\P P_{CNT}/\P M) > 0. \quad (27)$$

A larger money supply increases demand in the traded-good sector, worsening the trade balance. A larger money supply also increases demand in the nontraded-good sector, increasing the price of nontraded goods (condition 2 in 27). The nominal wage also rises in this sector (condition 1 in 27), but proportionally less than the increase in the price. Thus, the real consumption wage rises and the real production wage falls, leading to higher employment and output. As in Case 2, the supply of output in the Keynesian traded-good sector does not change, since the real production wage is constant.

A devaluation increases the price of the traded good, decreasing the quantity demanded and increasing the quantity supplied of this good. A higher price for the traded good also increases the demand for the nontraded good, through the cross-price effect, resulting in a higher price in this sector as well. Since the traded-good price rises more than the nontraded-good price, the wage in the nontraded-good sector will rise proportionally more (less) than the sector (aggregate) price. Thus, the real consumption wage falls and the real production wage rises, leading to lower employment and output in the nontraded-good sector.

CASE 4: Classical Traded (CT) and Keynesian Nontraded (KNT) Sectors:

In the last case, the nominal wage in the Keynesian nontraded-good sector and the traded-good price in the classical traded-good sector are both fixed. Thus, market clearing only affect the nominal wage in the classical traded-good sector and the price in the Keynesian nontraded-good sector. The equilibrium conditions are given as follows:

$$W_{CT} - W_{CT}(P_{CT}, P) = 0; \text{ and} \qquad (28)$$

$$Y^{s}_{KNT}(P_{KNT}, W^{e}_{KNT}) - Y^{d}_{KNT}(M, P_{KT}, P_{KNT}) = 0. \qquad (29)$$

These equilibrium conditions generate the following comparative static results:

$$(\partial W_{CT}/\partial M) > 0; \text{ and } (\partial P_{KNT}/\partial M) > 0. \qquad (30)$$

As before, a larger money supply increases the demand in both sectors, worsening the trade balance in the classical traded-good sector and raising the price in the Keynesian nontraded-good sector (condition 2 in 30). With a higher price in the Keynesian nontraded-

good sector, the real production wage falls, given a fixed nominal wage. Thus, output rises, since labor demand determines production in Keynesian sectors. In the classical traded-good sector, the price does not change. Thus, as we have seen before, the nominal wage increases proportionately less than the aggregate price level (i.e., $\pi > \omega_T > \pi_T = 0$). The real consumption wage falls and the real production wage rises, both leading to a decrease in output and worsening the trade balance.

A devaluation increases the price in the classical traded-good sector, increasing the demand for the nontraded good through the cross-price effect. Thus, the nontraded-good price rises. Since the nontraded-good sector is Keynesian, a higher price with a constant wage implies a lower real production wage and higher employment and output. In the classical traded-good sector, output also rises

IV. Summary and Conclusion:

The effects of an expansionary monetary policy and a currency devaluation on the output of each sector and in the aggregate economy under different sectoral characterizations appear in Table 1. Several general observations emerge. First, a larger money supply increases the demand for goods in both sectors, causing an increase in the price of the nontraded good. If the nontraded good is produced in the Keynesian sector, this price rise increases the quantity supplied, since the real production wage falls. If the nontraded sector is classical, on the other hand, the supply of output increases because the sector's price increase is greater than the aggregate price increases. That is, the real consumption wage rises and the real production wage falls, leading to more employment and output. Note, however, that the quantity supplied increases more in the Keynesian than the classical sector. This outcome occurs because the nominal wage is fixed in the Keynesian sector, but increasing in the classical sector. Thus, the real production wage falls more in the Keynesian sector, leading to a larger increase in employment and output. As a result, Case 1 is more likely to have a negative output effect in the traded-good sector

outweigh the positive output effect in the nontraded-good sector, other thinks constant, than Case 4.

Second, expansionary monetary policy increases demand in the traded-good sector, worsening the trade balance. While no change occurs in the output supplied if the sector is Keynesian, output decreases if the sector is classical. Since the aggregate price level increases more relative to the sectoral price (which does not change), the decrease in output in the classical traded-good sector affects the trade balance negatively. Thus, monetary policy worsens the trade balance more if the traded-good sector is classical, rather than Keynesian.

These first two observations show that when the traded sector is classical, expansionary monetary policy may lead to higher *or lower* output, depending on the magnitudes of the responses in the traded- and nontraded-good sectors. This result counters the findings of Duca (1987) Duca and Vanhoose (1990), and Waller (1992), who find that an increase in monetary policy increases output in both sectors. Our result emerges because the real consumption wage rises and the real production wage falls in the classical traded-good sector from an expansionary policy.

Third, a devaluation increases the domestic price of the traded good, thereby decreasing the quantity demanded in the traded-good sector, and improving the trade balance. The quantity supplied of this good increases, if the traded-good sector is Keynesian, further improving the trade balance. If the classical good sector produces the traded good, a larger increase in the sector's price relative to the aggregate price level leads to an increase in output. This also improves the trade balance, but less than in the Keynesian sector.

Finally, price increases in the traded-good sector from a devaluation have a cross-price effect on the nontraded-good sector, increasing the demand for the nontraded good. This increases the price of the nontraded good, but less than that of the traded good (assuming that the direct effect exceeds the indirect effect). If the classical sector produces a

nontraded good, then a relatively lower sectoral price decreases output, since the real consumption wage decreases and the real production wage increases. If the Keynesian sector produces the nontraded good, then a devaluation leads to an increase in output supplied, since a higher nontraded-good price means a lower real production wage with a constant nominal wage. So, a devaluation unambiguously increases total output, if the nontraded-good sector is Keynesian.

Once again, we find that a devaluation may have an ambiguous effect on aggregate output, if the economy has a classical nontraded-good sector. Output falls in response to a devaluation in the classical nontraded-good sector, which may offset the increase in output in the traded-good sector. Moreover, Case 1 is, once again, more likely to have a negative total-output effect from the devaluation, since output rises more in the Keynesian traded-good sector than in the classical traded-good sector. That is, the real wage falls more in the Keynesian traded-good sector, since the nominal wage is fixed.

Our analysis illustrates that sectoral conflicts can arise in the use of monetary and exchange rate policies. Expansionary monetary policy decreases output in the classical traded-good sector, while it increases output in the nontraded-good sector, whether classical or Keynesian. Similarly, devaluation has a negative effect on the output in the classical nontraded-good sector; while a positive effect in the traded-good sector, whether classical or Keynesian. If the sectors are of equal size, then our assumption of larger direct effects leads to an increase in output in both cases. If, however, the classical traded-good sector is large compared to the nontraded-good sector, then a monetary policy induced decrease in output in the classical traded-good sector may dominate the increase in output in the nontraded-good sector, so that total output in the economy declines. Similarly, if the classical nontraded-good sector is large so that the negative output effect of a devaluation dominates the positive effect in the traded-good sector, total output may decline as well.

Our findings suggest that the effects of monetary policy and devaluation in different economies depends on the extent of unionization and openness of different sectors. The

authorities must consider the underlying characteristics of the different sectors in the economy before framing policies. For some given sectoral characteristics, the authorities may use policy to favor certain sectors. The relative effects of these policies on output depend on whether classical and Keynesian sectors produce traded or nontraded goods.

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Table 1	Effects of Money Supply Increase and a Devaluation on Sectoral and Aggregate Output					
	Money Supply Increase			Devaluation		
Cases	T	NT	T+NT	T	NT	T+NT
CT+CNT	-	+	?	+	-	?
KT+KNT	0	+	+	+	+	+
KT+CNT	0	+	+	+	-	?
CT+KNT	-	+	?	+	+	+

Note: CT implies classical traded good sector, KT, Keynesian traded good sector, CNT, classical nontraded good sector; and KNT, Keynesian nontraded good sector. A +, -, and 0 imply an increase, decrease, and non-change, respectively.